

### **ABSTRACT OF THE DISCLOSURE**

A method and system of coherent detection of optical signals. The system utilizes a digital signal processor to recover an incoming optical signal. The system employs a local oscillator, which does not need to be phase locked to the signal. The signal may be consistently recovered, even when the polarization state varies over time. Additionally, the signal may be recovered when it comprises two channels of the same wavelength that are polarization multiplexed together. In addition, any impairment to the signal may be reversed or eliminated.